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STRATEGIC CONSIDERATIONS FOR CO-OPERATIVE CANADA/JAPAN ARCTIC MARINE TRANSPORTATION R & D

by

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17. Abstract

Japan has proposed a joint arctic marine transportation research and development (R&D) program with Canada as a means to ensuring long range access to Canadian arctic hydrocarbons. The report identifies and discusses a wide range of policy, strategic, tactical and other considerations which would affect Japan and Canada individually and together if they entered into such a program. The object is to '...assist Canadian decision-makers to identify strategies for implementing co-operative Arctic marine transportation R&D projects with Japan in a manner which will enhance Canadian Arctic marine transportation capability and secure significant industrial benefits for Canada in the process.

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17. Résumé

Le Japon a proposé au Canada d'entreprendre un programme conjoint de recherche et de développement en matière de navigation maritime dans les régions arctiques, visant à ouvrir un accès durable aux ressources pétrolières de l'Arctique canadien. Ce rapport cerne et analyse un large éventail de considérations politiques, stratégiques, tactiques et autres concernant les répercussions d'un tel programme sur chacun des deux pays pris séparément et sur les deux. L'étude avait été entreprise dans le but "d'aider les décideurs canadiens à dégager les stratégies de mise en oeuvre du programme susceptibles d'assurer au Canada le maximum de retombées industrielles positives et le développement de sa marine marchande arctique".

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PREFACE

Japan has, for some years, been proposing joint Research and Development with Canada in the field of arctic marine transportation. The Japanese aim has clearly been to secure a share of Canadian Arctic oil and gas. Any Canadian decision to participate in such a joint undertaking must recognize the long term implications of such a commitment.

This report identifies the wide range of strategic considerations that Canadian decision-makers should consider in respect of possible joint R&D with Japan in arctic marine transportation. Policy considerations for both Canada and Japan are reviewed, noting especially that currently Canada's potential for industrial benefits is not well defined.

The results of the study reported are summarized in an executive summary which essentially lists the many factors that should be considered as Canada responds to the Japanese initiatives.

EXECUTIVE SUMMARY

ES-1 The Japanese initiative in proposing to Canada a broad program of co-operation in arctic marine transportation R&D is the product of in-depth planning having its origin in two areas of major economic concern:

a) the need for a stable, long-term additional source of oil and gas.

b) the need to ensure that the means of transportation of arctic hydrocarbons are in place and that Japan secures an important portion of the large volume of ice-breaking tanker construction required.

ES-2 Japanese expectations are probably focussed more on natural gas (LNG) transportation than on oil.

ES-3 The Canadian Arctic, as a source of hydrocarbons, meets the Japanese criterion of "stable" in the political sense (as contrasted with OPEC sources), but lags far behind OPEC sources in "ready accessibility".

ES-4 Japan needs access to Canada arctic data and experience to be able to build with assurance ice-capable oil and LNG tankers of large capacity (up to 200,000 tons).

ES-5 Japan has turned to Canada not only because our data and experience of Arctic conditions are broader than their own but because the vessels and related systems they hope to see built are in fact designed for use in Canadian Arctic waters.

ES-6 Because Japan hopes to obtain both privileged access to Canadian hydrocarbons and the Canadian data and experience needed to capitalize on a major tanker-construction market, the Japanese authorities have multiple powerful incentives to share the ship-building opportunity with Canada, or other industrial benefits we may demand.

ES-7 Canada has postulated "industrial benefit" as one objective of proposed co-operation with Japan in arctic marine transportation R&D, but has not spelled out the nature of the industrial benefits to be sought.

ES-8 There is no Government-approved industrial policy for the Arctic which could serve as a guide to industrial benefits targets in the context of co-operation with Japan. The Report of the Special Committee of the Senate issued in March 1983 is a helpful guide but is not authoritative.

ES-9 Lacking defined benefit objectives, the Canadian approach to co-operation with Japan (and other countries) is dominated by considerations of environmental preservation, the protection of sovereignty and the acquisition of technologies not held in Canada.

ES-10 The choice of a partner for broadly based co-operation in arctic marine transportation R&D is limited to only a few countries and should be guided by certain criteria:

- know-how in large-scale tanker construction
- a domestic requirement for access to the hydrocarbon resources of the Arctic
- no threat or challenge to Canadian sovereignty
- multiple incentives to cause the chosen partner to share with Canada the industrial benefits of building arctic transportation systems

ES-11 Only Japan meets all of these criteria and has the motivation to concede Canadian industrial benefit demands.

ES-12 There is an urgent need to define Canadian industrial benefit objectives to be sought from Japan. The options range from the modest to the ambitious: from some industrial spin-off within each selected area of R&D co-operation (instrumentation production, etc.) through Canadian content in ice-breaking hulls built in foreign yards; to the construction in Canadian yards of complete ice-breaking tankers in the 200,000 ton range.

ES-13 The extent and timing of private sector involvement in any aspect of ice-breaking tankers must be resolved, preferably through co-operation as a Canadian consortium with a Japanese partner in a specific project of tanker construction in a Canadian yard.

ES-14 DRIE must assume more active responsibility for developing and obtaining Cabinet approval of the industrial benefits to be sought from co-operation with Japan in arctic marine transportation, and in negotiating them with the Japanese.

ES-15 Canada holds impressive assets to negotiate successfully with Japan for significant industrial benefits, but has underestimated its bargaining power from the outset. Our trump cards are:

- sole possession of Arctic data and experience required by Japan to build, alone or jointly with Canada, safe and efficient arctic tankers;
- sovereignty over the waters where the ships will operate;
- physical ownership of the resources to which Japan seeks access;
- regulatory control over access to, and conditions for ship operation in, the Arctic.

ES-16 There is a risk that our data and experience will be given away piecemeal in a series of R&D co-operative projects without securing any major industrial benefit in return.

ES-17 To avoid such an eventuality, Canadian assets should be bargained in a controlled and comprehensive way against the attainment of a major, defined industrial benefit

objective, which should be made known without further delay to the Japanese side. Co-operation in R&D should be treated as an important bargaining counter in a much broader industrial game.

ES-18 Construction in Canadian yards of a significant portion of the tanker tonnage that will be needed in the Arctic in future is the only major "industrial benefit" which could have a significant long-term impact on the Canadian economy.

ES-19 Japanese agencies and industries possess both the technical qualifications to co-operate with Canada in the selected R&D projects and the experience in the construction of large scale conventional tankers which Canada needs.

ES-20 Failure to move now to acquire arctic-capable tanker construction capability in Canada could mean that Canada will end up putting in place and paying for a costly infrastructure for the Arctic only to have foreign nations harvest the resources and carry them off in vessels built more or less entirely offshore. Canada

might again find itself rich through the sale and taxation of a resource but poor in the industrial and employment benefits to be derived.

ES-21 At least one major Japanese ship building company, Nippon Kokan KK, has evinced a readiness to license its technology to Canada as part of their contribution to joint production of LNG carriers.

ES-22 The hydrocarbon resources of the Canadian Arctic undoubtedly will be exploited sooner or later. The dilemma for decision-makers is whether the volume, price and markets for Arctic oil and gas are such as to warrant the creation now of a Canadian capability to build the ice-strengthened, large-scale tankers which will eventually be needed. Factors to be considered include:

- serious investigation of the willingness of Japan to provide investment capital, transportation know-how and assured markets for both the resources and the ships;

- the long lead times required to create the tanker construction capability and related arctic infrastructure, and the need to establish a footing in the arctic transportation field before offshore acquisition becomes an established practise;
- the vagaries of the oil/gas supply-demand picture in the light of the volatile conditions in the traditional sourcing areas, particularly the Persian Gulf;
- the risk-reducing attractions to the Government of a consortium approach on the part of Canadian industry, some Government participation through Petro Canada, and joint-venture participation by one or more Japanese yards;
- the need today for a large size dry-dock on the West Coast capable of servicing off-shore structures and tankers currently in use and of handling large-size tanker construction in the future.

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1. Background

1.1 In January 1982, within the framework of the Canada/Japan Science and Technology Consultations, the Japanese side informally proposed to the Canadian side that co-operative R&D activities be undertaken in the field of Arctic marine transportation. At a meeting in Ottawa, June 14-15, 1982, the two sides committed themselves in principle to a one-year feasibility study to determine the project areas which best lend themselves to co-operative R&D; the commitment was formalized at a further meeting in Ottawa March 14-15, 1983.

1.2 The Japanese initiative did not occur overnight; rather it was the outcome of an evolutionary process they had begun in 1975, when they proposed to Canada co-operation in "Northern Transportation Shipping" and which had been gradually extended in the intervening years through information exchanges with the National Research Council on "Ships in Ice-covered Waters", with the Department of Public Works on "Harbour and Coastal Shipping" and with the Department of Energy, Mines and Resources on Remote Sensing. Following the June 1982 "agreement in principle", Japan had moved quickly to undertake a "pre-feasibility study", to be completed by March 31, 1983, under the co-ordination of the Science and Technology Agency. Canada, for its part, assigned

the preparatory responsibility to an Interdepartmental Working Group on Canada/Japan S&T, Arctic Marine R&D, under the chairmanship of the Marine Transportation Administration of the Department of Transport.

1.3 At the Canada/Japan March 14-15, 1983 meeting in Ottawa, seven major project areas of R&D co-operation were tentatively identified:

Low Temperature Naval Materials

Propulsion Systems for Large Ice-breaking Vessels

Full Scale Trials (of new instrument systems or analytical technology)

Harbour and Coastal Shipping

Remote Sensing of Sea-ice

Remote-control Submersibiles

Life Saving Equipment/Procedures

1.4 No immediate decision was taken to embark on a formal program of co-operation pending further clarification of Japanese (and Canadian) capabilities and objectives, to be determined by a visit to Japan of a Task Force from Canada. Following a series of post-ponements, including one near cancellation of the entire project, compounded by some indecision about the size and composition of the mission, a small investigative team comprising five government officials and no

industry participants visited Japan 24 Nov - 10 Dec, 1983.

1.5 In brief, their recommendation is to proceed immediately in three "theme" areas - ice-tank technologies, low temperature tolerant naval materials and propulsion systems (especially COGAS) - while reserving for later stages projects relating to ice hazard detection, investigation of a 200,000 ton tanker design, and drive train studies. Negotiations for full-scale trials were deferred. These reflect Canadian rather than Japanese preferences, and the slate of projects may be subject to further negotiation. A third meeting of the Canada-Japan task force is planned for late 1984 - probably November.

1.6 The purpose of this report, and of the several commentaries submitted during the pre-feasibility period, is to assist Canadian decision-makers to identify strategies for implementing co-operative Arctic marine transportation R&D projects with Japan in a manner which will enhance Canadian Arctic marine transportation capability and secure significant industrial benefits for Canada in the process.

2. Policy Considerations Affecting Progress

2.1 On the face of it, the slight delay in the selection of and approval to proceed with co-operative R&D projects is not serious, since economic circumstances are such with regard to the exploitation of the resources of the Canadian Arctic that there is no perceived urgency concerning the acquisition and perfection of related Arctic marine technologies and data acquisition. On the other hand, lead times for everything connected with Arctic marine transportation will be long and international developments affecting other hydrocarbon-bearing regions of the world (e.g. tension in the Persian Gulf) can be swift and calamitous, thus altering almost overnight domestic and international perceptions of the timing and tolerable costs of Arctic resource exploitation. The prudent course for Canada is to begin without delay putting in place all the systems and technologies which will sooner or later be required for the safe exploitation of the Arctic.

2.2 It is relevant therefore to examine why it is that the proposed co-operation between Japan and Canada in Arctic marine transportation R&D, where there appears to be a uniquely compelling coincidence of interests and expertise, has encountered some difficulty in getting off the ground. It must be stated at once that the reasons should not be sought in any lasting

concern about Japan's ability to carry out their side of any co-operative R&D projects that may ultimately be approved. At Appendix I is a list of Japanese agencies concerned, each of which has the technical personnel and modern facilities to execute some aspect of the R&D. At Appendix II is a further list of Japanese companies similarly endowed to execute the industrial implementation of approved projects. Although Canada took the position over a two year period that further evidence was required of Japan's technical qualifications to undertake certain co-operative work, all doubts were effectively put to rest by the findings of the Canadian investigative mission of November-December 1983. Within their respective areas of specialization, there is no dearth of Japanese agencies and companies capable of acting as competent partners for their Canadian counterparts in any approved projects.

2.3 Nor is there any doubt about the Japanese will to proceed, although their enthusiasm for doing so in co-operation with Canada could diminish in the face of continued Canadian hesitation. The following sections examine in some detail the Japanese approach to major national programs, their motivation in the case of Arctic marine transportation, their priorities and objectives in seeking co-operation with Canada and how far they may be prepared to go in accommodating Canadian industrial objectives.

3. Japanese Policy Considerations

3.1 General

3.2 There is very little direct intervention in the economy by the Japanese Government in the sense of ownership or equity participation in industry. Indirectly, Government influence is enormous in that it is the function of certain agencies and departments - notably, The Ministry of International Trade and Industry (MITI), The Economic Planning Agency (EPA) and The Science and Technology Agency (STA) - to identify long range economic goals in the resource, scientific and industrial sectors and thereafter, through direct and indirect funding, to develop an approach to realization of the goal to the point where the private sector can implement the necessary programs. In the early stages of such macro-economic planning, heavy reliance is placed on the skills available in Government, the Universities and in public and private research laboratories. Only when a consensus has been developed between government, academie and industry through a complex process of vertical and horizontal consultation is industry brought in to develop specific concepts and designs for implementation. The entire process to that point is known as governmental "administrative guidance" and is one of the keys to the success of the Japanese economy in everything from the provision of a steady, secure flow of resources on a global basis to the conquering of specific markets in everything from cars to computers.

3.3 Specific

The foregoing is necessarily an abbreviated and over-simplified account of what is in reality a long and involved process of economic planning. It can, however, be safely assumed that the 1975 approach to Canada concerning possible collaboration in Arctic marine transportation R&D was the result of just such a governmental process, and that it had its origin in two areas of major economic concern:

1) the need for a stable, long-term additional source of oil and gas;
2) the need to ensure the means of transportation of Arctic hydrocarbons, with attendant benefits to the Japanese ship-building industry.

3.4 Regarding 1) above, if there ever was any doubt about the policy context in which Japan is approaching co-operation with Canada in Arctic transportation, it was effectively dispelled at the March 1983 joint preparatory meeting in Ottawa. The opening paper presented by the Japanese delegation leader placed their goal squarely within Japanese long-range energy planning. The 1972 OPEC oil embargo had caught Japan with only 5 days' reserves in hand and the 1979 price hike had threatened the financial stability of the country because of Japan's massive reliance on imported oil for electricity generation and therefore industrial production. Despite their consequent decision to amend their energy policy to aim at a progressive reduction in percentage dependence on

oil (and especially OPEC- sourced oil), from 66% to 49% by 1990 and to 38% by 2000, Japanese volume requirements for oil show a slight increase over the same 20 year period (from 285M Kl to 290M Kl per annum) and a sharp increase in natural gas requirements from 25.9M Kl to 82M Kl (Appendix III). Oil and gas from the Arctic (where some 20% of the world's reserves are estimated to lie) are thus a very important alternative source for Japan. Of the two, Japanese expectations are probably focussed more on natural gas (LNG) than on oil, judging by their own consumption projections. In any event, the Canadian Arctic appears to be well endowed with both - probably more gas than oil according to current drilling results in the Beaufort Sea and Arctic islands.

3.5 "Stable" sources of both resources are very high priority objectives for Japan, which will have been reinforced by the 1972 and 1979 OPEC "SHOKUS" and by current military activity in the Middle East. "Stable sourcing" is usually defined by Japan as "sufficiently diversified to avoid over-dependence on any one source". In reality, they place equal importance on two other considerations as well:

1) sourcing from politically stable areas (where Canada clearly outranks the Middle East, Mexico, Venezuela, Nigeria and Indonesia - though not China).

2) ready accessibility and transportability (where equally clearly the Canadian Arctic lags far behind other areas at present).

3.6 Because the Japanese place such a premium on the political stability of their sources of energy resources, they are prepared to invest money, time and effort to achieve accessibility and transportability of Canadian Arctic hydrocarbons - hence their initiative to co-operate with Canada in R&D on Arctic marine transportation. In short, they accord very high priority to ensuring that the hydrocarbon reserves of the Arctic area can be tapped and safely transported to markets. Since it is already proven that they can be tapped and that adequate quantities, especially of gas, are present, the Japanese focus is on safe transportation, where technology is only in its infancy, but where most of the data and experience lie in Canadian hands. The Japanese aim is to be able to build ice-capable oil and LNG tankers of large capacity suitable for operation in the Arctic environment and to develop all of the ancillary services and technologies needed to maintain such carriers in safe operation. They need Canadian experience and data and access to our Arctic seas to do so with assurance, although they would somehow get the best available elsewhere if we were to refuse our co-operation.

3.7 It should be noted that Japanese goals are only marginally related to ice problems encountered in their own northern regions. Hokkaido and its adjacent islands are not really "Arctic"; their harbours are largely ice-free and ice movements in the adjoining seas are infinitely less severe than in the Canadian Arctic. Japanese ice-breaking and ice-movement experience is therefore confined to the relatively moderate ice conditions in their home and adjacent waters (Sea of Okhotsk) and to their experience of Antarctic waters, where ice conditions are not really comparable with those in the Canadian Arctic.

3.8 It is important to grasp, therefore, that the Japanese have turned to Canada not only because our data and experience are broader than their own but because the vessels and related systems they hope to see built are in fact designed for use in our Arctic waters.

3.9 The Japanese would gain two main objectives from this thrust towards Canada:

3.9.1 1) Japanese access to a large, stable source of hydrocarbon in the Canadian Arctic or, if direct access is denied, at least Japan will have assisted in developing a large new source which will relieve supply pressures on other, older sources as world demand for oil grows.

It should be noted in this connection that Canada has made no commitment to allow Japan privileged access to Canadian oil and gas, Arctic or otherwise. All exports still fall within the framework of the

National Energy Program and are confined to those quantities deemed surplus to Canadian domestic requirements as determined from time to time by the National Energy Board. Japan can be expected to resist any plans to move Arctic oil and gas southward by pipeline and to strongly prefer sea shipment, for import and ship-construction reasons. Canada has a powerful bargaining tool, which could be invoked at the appropriate time, if we wished to assure to Japan direct import access to some part of ultimate Canadian Arctic production in exchange for investment by Japan in ship-building in Canada or in extraction of the resources.

3.9.2 2) Ship and related technology which would enable Japan to dominate the Arctic marine transportation sector.

It can be assumed that MITI has done a thorough market study of the tonnage of ice-breaking tankers that will be needed over the next 25 years or so to transport the Artic hydrocarbons and have seen in the high-volume requirement* an opportunity to

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*Canadian studies carried out in the 1970s estimated tanker traffic in the north by 1995 to be:

- 480 round trips per year by oil and LNG tankers from the Beaufort Sea, MacKenzie Delta and Melville Island fields
- up to 132 trips per year by foreign flag carriers carrying Alaskan Oil to the Atlantic
- up to 168 trips per year bringing gas and oil out of the High Arctic

Polar X class hulls would be required to supply winter exploration activity in the Islands.

revive the flagging fortunes of their shipbuilding industry. At the same time, Japan has a powerful incentive, with or without direct access to the resources, to share the shipbuilding opportunity with Canada (e.g. through joint ventures with Canadian yards) simply because we alone control the environment in which the tankers will operate. The Japanese are realistic enough to know they can achieve their shipbuilding goals best with Canada's co-operation - hence their initiative. They will almost certainly go on trying to enlarge the areas of R&D co-operation, even in the face of Canadian hesitation or resistance, and it is this factor, among others, which gives Canada the bargaining power to achieve whatever "industrial benefit" goal or goals we choose to define. Canada"s problem is that we have yet to define the industrial benefits we are seeking, or the strategies to achieve them.

4. Canadian Policy Considerations

4.1 General

4.2 Ever since the Japanese initiative was launched in 1975, Canada has taken the position that something more than mutual scientific interest must govern the ultimate selection of projects or even the decision to go ahead at all with any co-operative projects with Japan; our repeatedly stated objective for proceeding has consistently been "industrial benefit for Canada", without, however, giving any precision to the nature of the industrial benefits we seek or would consider as satisfying that general goal.

4.3 In defence of those charged with the responsibility of managing the exploratory dialogue with the Japanese it must be stated that their task has been made more difficult by the absence of any clearly defined industrial policy for the Arctic. The Report of the Special Committee of the Senate on the Northern Pipeline of March 1983 perhaps comes closest to setting a series of goals to be achieved. With regard to the Arctic marine transportation sector, the Senate Special Committee recommended:

a) special training for personnel responsible for operating and safety standards;

b) high priority for R&D in "cold ocean technology";

c) all transportation systems for marine services - ice monitoring, weather forecasting, navigation aids, search and rescue services and marine escort services - be in place before resource production commences;

d) Coast Guard be upgraded;

e) transportation of hydrocarbons by tanker be commenced with small-scale tankers;

f) immediate consideration, however, be given to developing a Canadian large vessel shipyard capability to supply all vessels needed for Arctic development;

g) regulatory processes be reviewed and rationalized;

h) the Federal Government play a lead role in formulating an industry strategy to ensure maximum Canadian participation in major projects.

4.4 Lacking the force of Cabinet sanction, the Senate Special Committee report, while a helpful guide to action, can scarcely be deemed to be an authoritative statement of policy for the Arctic, industrial or otherwise. Negotiators with Japan have therefore relied for guidance on certain broad objectives which can be distilled from approved programs of the various Departments active in the administration of the Arctic. These might be

summarized as follows:

1) the need to ensure safe and secure means of transporting resources from Arctic regions in order to protect the environment;
2) the need to assert and protect Canadian sovereignty within the Arctic archipelago;
3) the need therefore to ensure that adequate support services are in place to serve these ends - ice-monitoring, navigation aids, ice-breaking capability, weather forecasting, search and rescue services, etc.
4) the desirability of co-operating with other countries in developing support services;
5) the stated but undefined desire to ensure "industrial benefit" for Canada in the provision of support services and transportation systems in the Arctic;

4.5 Specific Issues

4.6 The mandate of the team dealing with possible co-operation with the Japanese in Arctic marine R&D touches on all of the above areas. Specific problems have been encountered from the beginning in the following areas:

4.6.1 i) Cooperation with Other Countries

Only a few countries in the world have the geographical conditions and industrial/financial capacity to offer significant reciprocal benefits in any program of R&D or industrial co-operation in Arctic programs.

They are the U.S.A., U.S.S.R., Germany, Finland and Japan, and data exchange programs have been established with all of them. Each has its own coterie of protagonists within the Canadian Arctic establishment as the preferred parties for R&D co-operation.

4.6.2 ii) If, however, a major aim of Canadian policy is, as stated, to obtain significant industrial benefit from any program of co-operation, up to and including the ability to construct in Canadian shipyards the large-scale ice-capable tankers that will be needed to carry the hydrocarbon resources of the Arctic to international markets, then the choice of a partner for such co-operation must meet certain criteria, viz:

- the know-how to build large scale tankers
- the money to invest in joint ventures in Canada
- a domestic incentive for access to the hydrocarbon resources of the Arctic
- no threat or challenge to Canadian sovereignty
- multiple incentives to make them willing to share with Canada the industrial benefits of building Arctic transportation systems.

4.6.3 Although all the countries with which Canada has data exchange arrangements meet some of these criteria, only Japan meets them all; yet it is nevertheless true that Japan's overture to Canada to co-

operate in Arctic marine R&D has been treated with reserve and even suspicion from the outset, perhaps because of fear of being unable to strike a balance of advantages with the traditionally hard-bargaining Japanese. In fact, such fears are largely unfounded and based on an out-moded view of Japanese industrial and inter-governmental behaviour. With multiple incentives present to prompt them to seek co-operation with Canada and having taken the initiative after thorough policy research as is their custom, it can be assumed that Japan will expect Canada to assert a claim to countervailing industrial benefit and will be prepared to concede Canadian demands. Having arrived at contractual undertakings at governmental and industrial levels, it can equally be assumed that Japan will carry out its undertakings to the letter even if major concessions in terms of jobs, technology transfer and financing have to be made.

4.7 Lack of Definition of "Industrial Benefits"

"Reciprocity in benefits" and "industrial benefits" are two objectives of the pre-feasibility Canadian team as set out in its Terms of Reference. These are however not further defined, thus leaving unspecified the nature or extent of industrial benefits to be sought. There is an urgent need for objectives to be set by

the Canadian Government as between a number of target industrial options:

4.7.1 i) are we aiming at industrial benefits within each selected area of R&D co-operation - a modest but achieveable goal in terms of instrumentation production - or at some higher industrial objective which will be of major future significance to the Canadian economy?

4.7.2 ii) if the latter, is it Canada's objective to secure some share of the ice-breaking tanker construction that will be required to transport resources from the Arctic?

4.7.3 iii) if industrial benefits in the ship construction sector are contemplated, is the objective a reasonable share of sub-components and equipment for tankers built in foreign yards or are we aiming for the construction in Canada of whole tankers with ice-breaking capability?

4.7.4 (iv) if the last, is the Canadian goal large-scale ice-breaking hulls in the 200,000 ton range such as will be required for commercial scale exploitation of Arctic hydrocarbons, or something more modest, at least at the outset, as recommended by the Senate Special Committee? It should be noted in this connection that the R&D being conducted in Japan and elsewhere seems to be focussed on large sized hulls, presumable because their aim is largely

commercial, whereas Canada's commercial concerns must be tempered by safety and environmental concerns.

4.7.5 There is thus a span of industrial benefits which could be targeted, ranging from the modest to the ambitious - the latter involving a major attempt to define a renewed role for Canada's shipbuilding industry, with all the attendant financial and marketing implications of such a choice. It is to be noted that a May 1983 industrial mission to Japan under the aegis of the then Department of Industry, Trade and Commerce tended to emphasize Canadian content (i.e. the provision of equipment and sub-components up to 25-50%) as distinct from achieving large-scale shipbuilding capability in Canadian yards, as being the more reasonably attainable Canadian objective. The approach adopted by Dome Petroleum at an earlier stage similarly tended to fix the industrial objective in the shipbuilding sector at the lower end of the range of options available, doubtless for short-term financial reasons.

4.8 Two subsidiary concerns must be addressed in the process of defining industrial objectives.

4.8.1 ii) the extent and timing of private sector involvement in the on-going dialogue with Japan to define areas of co-operation. As noted above, the practice in the private sector to date has been to be content with a modest "Canadian content" requirement in ships built in foreign yards for use in Canadian waters as a sufficient Canadian industrial objective. However, at a government-industry seminar on Arctic Marine Transportation R&D co-operation with Japan held in Ottawa in April 1983, a consensus emerged that industrial benefit should include the capacity to build in Canada large scale ice-breaking tankers. Practice and theory seem to be thus at odds within the shipbuilding industry and probably will remain so until such time as there is a practical project on which to focus. The Panarctic Oils Ltd. proposal to begin lifting oil in commercial quantities from Arctic islands' production could provide the focus for government/industry decision making in respect of ice-capable tanker production in Canadian yards.

4.8.2 A lesser but nevertheless significant problem hindering the pursuit of industrial benefits lies in the administrative arrangements for managing the dialogue with Japan. For a host of valid rasons, the Department of Transport's Marine Administration has been given responsibility for Arctic transportation R&D co-operation with Japan and for preserving industrial benefits as an objective, yet the direct responsibility for the latter rests with a different branch of Government, now the Department of Regional Industrial Development (DRIE). Similarly, on the Japanese side, the STA (Science and Technology Agency) is conducting the dialogue with Canada, but the responsibility for the industrial aspects is the province of MITI (Ministry of International Trade and Industry). The structure of the missions on both sides is thus not ideally suited for the negotiation of industrial benefits, yet these must be addressed to fulfil the mandate at least of the Canadian side. It is suggested that a much more active role be assigned to DRIE in securing Government approval of industrial benefits to be sought as a bi-product of the R&D exercise with Japan and in negotiating those benefits with Japan.

5. Strategic and Tactical Considerations

5.1 It would appear that Canada has underestimated from the inception of the dialogue with Japan three factors which give Canada substantial leverage to obtain major industrial benefits.

5.1.1 i) the extent to which the Japanese side is driven by self-interest to seek co-operation with Canada (as discussed in 3.9 above) and therefore prepared to make concessions to achieve its aims;

5.1.2 ii) lack of recognition of the trump cards Canada holds in its approach to bargaining for industrial benefits;

5.1.3 iii) an apparent inability to use such assets coherently and comprehensively in discussion with the Japanese side, partly for lack of defined objectives and partly because of jurisdictional contradictions.

5.2 With reference to (ii) above, Canadian "assets" are formidable. They include:

- the possession of Arctic experience and data which Japan requires in order to build, either alone or jointly with Canada, safe and efficient tankers for Arctic use;
- sovereignty over the territory and waters where the ships will operate;
- physical ownership of the resources of which Japan seeks a share;
- regulatory control over access to and conditions for ship operation in the Arctic.

5.3 Had Canada had a clear industrial goal from the outset - for example the acquisition of large scale ice-capable tanker construction in Canadian yards - the negotiating team would have been well placed to bargain from a position of strength. Instead, because the talks are being held on a series of discrete possible R&D projects, each of which has its own intrinsic merit and self-contained potential for modest industrial benefit, there is a real probability that Canadian assets will be bargained away piece-meal without achieving any major industrial benefit for Canada - and indeed without Japan's ever being made aware that such a Canadian objective was in mind.

5.4 The approach to Japan should be well-defined, comprehensive and controlled, and our industrial aims should be made known to them as early in this preparatory stage as possible - and certainly before any R&D co-operative projects are individually agreed to. Collectively, such projects add up to a powerful bargaining asset; one by one they are relatively insignificant, even though each will bring some useful benefit to Canada. Arctic R&D should be portrayed as an area of potential co-operation in which Canada has something unique to contribute rather than one in which Canada has something to gain if narrowly defined. Co-operative R&D is an important bargaining counter to be used in a much broader industrial game.

5.5 If the large-scale tanker construction capability is indeed accepted as our goal, we can achieve it only through

co-operation with Japan across a broad spectrum of R&D projects. If we try to go it alone, or in concert with other countries with a lesser incentive to co-operate, we shall end up building a few high-cost ships largely at Government expense, while Japan will build on its own the future Arctic - capable commercial tanker fleet. We cannot compete with them on those terms; we will gain much more through co-operating with them in joint ventures in Canada for construction of at least part of the required fleet. 50% of the total tonnage would be a realistic target.

5.6 The resources of the Arctic are the "last frontier" in Canada - one which ought not to be opened to full scale exploitation without attaining a major industrial benefit for Canada. Since the opening of the Arctic is only in its infancy, now is the time to set the policies which will link access to the resources on the one hand to realization of a major, defined industrial objective on the other. There is some risk that unless early action is taken to define and pursue that objective, Canada will end up putting in place and paying for an elaborate system of support services for the Arctic, only to have foreign nations come in, harvest the resources and carry them away in vessels built more or less entirely offshore. Canada could again find itself rich through the sale and taxation of a resource but poor in the industrial and employment benefits to be derived - in this instance from the large tonnage of transport that will be required.

5.7 The Nov-Dec 1983 exploratory mission to Japan identified agencies and companies able to carry out co-operative projects with Canada in five of the seven areas of prospective joint endeavour initially established. These are:

1. full-scale trials in ice covered waters;
2. ice tank trials to assist in the establishment of jointly agreed full-scale design criteria;
3. determination of ice-breaking parameters for large ice-breaking vessels;
4. high power propulsion systems for large ice-breaking vessels;
5. remote sensing of sea ice conditions by over-the-horizon radar.

5.8 As the Canadian mission's report stated "these proposals can be seen to fit neatly into the industrial project sponsored by the seven leading shipbuilders (The Steering Committee of the Ice-breaking Ship Research Panel) to develop a conceptual design for a 200,000 tonne dead weight ice-breaking oil tanker. Serious consideration should, then, be given to Canada-Japan co-operation at the conceptual design stage rather than at the specific individual research project. Properly handled, co-operation at this stage would ensure a Canadian influence on the basic conceptual design and provide a framework for collaboration and joint work between Canadian and Japanese companies and shipyards".

5.9 The recommendation is sound, on two counts:

- it would provide the industrial project focus needed to crystalize Canadian private sector participation;
- it leads squarely in the direction of the only major industrial advantage likely to flow from the R&D co-operation project - viz: a Canadian capability in large scale, ice-breaking tanker construction.

5.10 In addition, the Canadian mission identified the following shipbuilding yards with experience in large hull construction and modern shipbuilding techniques of the caliber Canada would seek in a joint venture with Canadian yards:

- Sumitomo Oppama Shipyard
- Nippon Kokan K.K., TSU Shipyard
- Ishikawajima-Harima Heavy Industries (IHI)
- Mitsubishi Heavy Industries Ltd.

5.11 Two of these have done extensive work on Canadian projects - Sumitomo for Mobil on semi-submersible concrete platforms for Hibernia, and Class 3 barges for Arctic Transport Ltd. for the Beaufort; IHI for Gulf for instrumenting Molipac caissons for ice stress. A Third - Nippon Kokan KK has indicated its interest in joint ventures with Canadian shipyards and a willingness to license its LNG membrane tank technology to a Canadian facility as part of their contribution to joint production of LNG carriers.

(NKKK has a long history of friendly relations with Canada. Its Chairman, Mr. Makita, is Co-Chairman with Mr. David Culver, President of ALCAN of the Canada-Japan Business Co-operation Committee.)

6. The Dilemma of Timing

6.1 This report has established that large-scale, ice-breaking tanker capability is the only major identifiable industrial benefit that Canada might obtain through Arctic Marine Transportation R&D co-operation with Japan and that it is a realistic objective if Canada plays its cards in a comprehensive, controlled way. It does not however, attempt to address the obviously relevant questions as to whether the projected production volume, price and markets for Arctic hydrocarbons are sufficient to warrant the creation of the related Canadian capability to build the large-scale ships needed. It is evident from at least one recent DRIE study (OIRB Demand and Supply Analysis, April 12, 1984) that Arctic production is considered the least likely of all Canadian reserve areas to continue at a significant pace given the hazards of low proven reserves, high labour, capital and transportation costs, unproven technology and relatively depressed oil and gas prices on the world market. (The assessment assumes, however, that export sales to the U.S. would be critical to Arctic hydrocarbons development, whereas it is quite evident that Japan is an alternative source of capital, transportation know-how and markets which has not been seriously assessed.)

6.2 The dilemma for planners and for industry is not just whether to enter the large-tanker building arena, but when. On the one hand, the major demand for Arctic tanker tonnage

may be one or two decades off; on the other, the lead times for creating the capability and all the related infrastructure are long, and the opportunity to establish this option for Canada may be a fleeting one. If, to move West Coast and Beaufort oil and gas production, the precedent is established of building the ships and structures offshore, with only some "Canadian content" by way of industrial benefit, it will be extremely difficult to break into the field later when the demand for transport is higher and the risks less.

6.3 To bridge the time gap it is suggested that the Canadian option to enter the large-scale Arctic tanker construction industry be preserved by firmly establishing in the Japanese mind that this is Canada's intention, and that acceptance of that aim by the Japanese be made a condition precedent of a broadly-based program of Arctic marine transportation R&D over the next five to ten years. A pilot project for the construction in a Canadian yard, in a joint venture with a Japanese company, of a smaller scale prototype tanker to handle near term production from the Arctic Islands would provide a low-risk entry into the field.

7. Miscellaneous Considerations

7.1 Five further considerations should be weighed in any decision to make large-scale ice-capable tankers the principal long-term industrial benefit being sought by Canada in the context of co-operation with Japan.

7.1.1 i) in assessing whether the volume of Arctic oil and gas to be lifted would warrant a Canadian initiative on tanker-building capability, not only the 50,000 bbl/day near-term production from Panarctic should be taken into account, but also the projected production from the Polar Gas Project and Arctic Pilor Project, even though both are temporarily stalled;

7.1.2 ii) the fact that Panarctic is more than 50% owned by Petro-Canada offers a convenient vehicle for Federal Government involvement, both financial and organizational;

7.1.3 iii) to spread the capital burden, a consortium of Canadian shipyards would be required as the Canadian partner to the chosen Japanese shipyard. A 50/50 joint venture with the Japanese yard would further dilute the capital costs to the Canadian side;

7.1.4 iv) Experience of relations with Japan in the automotive sector would seem to confirm that a firm Canadian decision to require co-operation in tanker construction in Canadian yards as the price of broad R&D co-operation in Arctic Marine Transportation would receive a positive Japanese response.

7.1.5 v) Whatever the requirement for ice-capable tankers may be in the long-term, there is a need now on the West Coast for a large size dry dock, capable of handling off-shore structures and LNG tankers currently in use. Such a dry dock could serve the dual purpose of repair and maintenance of West Coast and Beaufort tankers/ structures today and be capable of accommodating large size tanker construction for the future.

Appendix I

Major Japanese Government Agencies
Engaged in Arctic Marine Transportation Research

National Research Institute for Metals

Ministry of Transport Ship Research Institute

Maritime Safety Agency

Kokkaido Development Agency

Meteorological Agency

Japan Marine Science and Technology Centre (JAMSTEC)

Ministry of Post and Telecommunications

TOKAI University)
) acoustic telemetry
MIE University)

Appendix II

Principal Japanese Companies Engaged in Arctic Marine Transportation Research and Development

Steel Manufacturers

Nippon Steel
Nippon Kokan KK
Kawasaki Steel Corp.
Sumitomo Metal Industries Ltd.
Kobe Steel Ltd.

Heavy Industries (Ice Engineering)

Mitsui Shipbuilding and Engineering
Mitsubishi Heavy Industries
Nippon Kokan KK (TSU Research Laboratories)

Electric Machinery

Matsushita
Toshiba
Hitachi
Mitsubishi Electric
Sony
Sanyo

Robot Producers

Kawasaki Heavy Industries Ltd.
Yasukawa Electric Manufacturing Co.
Toshiba Seiki Co. Ltd.
Kobe Steel Ltd.

Propellors

Nakashima Propellor Works

Biotelemetry

Koden Seisakusho
Japan Society for Promotion of Machine Industries

Accoustic Communications (for submersibles and divers)

Shimada Rika Co.
Oki Electric Industry Co.
Nihon Yushi Co. (accoustic tracking and release)

Remote Sensing

Hitachi Shipbuilding Co.

Ice-Free Measurements

Mitsui Zosen Co., Hokkaido
Mitsubishi Heavy Industries
Nippon Kokan KK

Long-term Energy Supply-Demand Outlook

(Interim Report by the Supply-Demand Subcommittee of the Advisory Committee for Energy April 21, 1982)

Item \ Fiscal year	FY1980 (Actual)		FY1990		FY2000 (Tentative)	
Demand for energy	) 429×10⁶ kl		590×10⁶ kl		about 770×10⁶ kl	
Energy-saving rate			15.5 %		about 25 %	
Item / Type of energy	Actual	Component ratio (%)	Actual	Component ratio (%)	Actual	Component ratio (%)
Coal	92.4×10⁶ ton	16.7	153×10⁶ ton	19.5	about 200×10⁶ ton	19.0
(of which domestic coal)	18.1×10⁶ ton		18\20×10⁶ ton			
(of which coal)	21.3×10⁶ ton		66×10⁶ ton			
Nuclear power	15.7 thousand MW	5.0	46 thousand MW	11.3	about 90 thousand MW	18.0
Natural gas	25.9×10⁶ kl	6.0	68×10⁶ kl	11.5	about 82×10⁶ kl	11.0
(of which domestically produced natural gas)	2,200×10⁶ m³		7,300×10⁶ m³			
(of which LNG)	16.8×10⁴ ton		43×10⁶ ton			
Hydro (Conventional)	19 thousand MW	5.6	23.5 thousand MW	5.0	about 30×thousand MW	5.0
Hydro (Pumped storage)	10.8 thousand MW		22 thousand MW		about 33×thousand MW	
Geothermal	0.3×10⁶ kl	0.1	6×10⁶ kl	1.0	about 15×10⁶ kl	2.0
Synthetic fuel oil, new energy, others	0.7×10⁶ kl	0.2	15×10⁶ kl	2.5	about 65×10⁶ kl	8.0
Petroleum	285×10⁶ kl	66.4	290×10⁶ kl	49.1	about 290×10⁶ kl	38.0
(of which domestically produced oil)	0.5×10⁶ kl		1.9×10⁶ kl			
(of which LPG)	14×10⁶ ton		24×10⁶ ton			
Total supply	429×10⁶ kl	100.0	590×10⁶ kl	100.0	about 770×10⁶ kl	100.0

1. This long-term outlook represents an energy supply-demand outlook formed on conditions that the government would implement preferentially and systematically its comprehensive energy policy measures with the maximum understanding and cooperation of the private sector.
2. The energy-saving rate represents improvement of energy productivity shown in terms of decrease in unit energy demand as against GNP with fiscal 1980 as the base year. This is a target indicator of energy conservation. Demand for energy projected at 590 million kiloliters in FY1990 should be reduced further by stepped-up energy-saving efforts.
3. Utmost efforts must be made continually to develop and import energy sources alternative to petroleum in order to expand supply capacity.
4. Utmost consideration must be paid to securing a stable petroleum supply. It is possible, however, that Japan's dependence on petroleum will be brought down even below 50% of her total energy needs in FY1990 through the various efforts explained above.
5. Domestically produced petroleum and natural gas combined will be 9.5 million kiloliters in FY1990.
6. As regards domestic coal, efforts must be made to sustain the current production level as a matter of basic policy. Basic thinking should be that domestic coal production would be increased to attain an annual target of 20 million tons in the future, pending improvement of circumstances.
7. Geothermal power will be about 3 thousand kW in FY1990 and about 8 thousand MW in FY2000.
8. Amount of energy supply to be made possible under the Sunshine Project will be about 2% of total energy supply in FY1990 and about 7% in FY2000.
9. Since the government's energy policy is long term in nature, the FY2000 energy supply-demand outlook is a tentative projection made to show one possible future direction.

(Note) 1. Crude oil equvalents were calculated at the rate of 9,400 kcal/liter.
2. Figures for "Coal" include liquefied coal and gasified coal.
3. The amount of domestic coal given here excludes miscellaneous coal.
4. "Synthetic fuel oil, new energy, others" column includes liquefied coal, oil sand, oil shale, alcoholic fuel, solar energy, firewood, and charcoal.
5. Total numerical values given in each column under "Component ratio" may not come up to 100 because percentage figures were rounded out to the nearest whole.